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Health Conditions and Expenditures in Haiti: Evidence from the Haiti Household Expenditure and Consumption Survey

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Abstract
In 1986, the Institut Haitien de Statistique et d'Informatique (IHSI) with support from the U.S. Agency for International Development (USAID) implemented a nationwide Household Expenditure and Consumption Survey (HECS) to gather socioeconomic data to analyze nutrition, health, welfare, food pricing policies, and other issues related to Title III, and to provide IHSI with data to calculate consumer price indexes and national accounts. Data were gathered from November 1986 through September 1987.

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Agriculture, International nutrition, Public health, Demography

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Effective assessment of health status and development of health policies and programs require information on factors affecting health, health expenditure patterns, and health care choices within the population. This report documents health expenditure patterns, childhood anthropometric measures as an indicator of overall health and nutrition, and household utilization of health care services based on evidence from the 1986-87 Haiti Household Expenditure and Consumption Survey (HECS) conducted by the Institut Haitien de Statistique et d'Informatique (IHSI) with support from the U.S. Agency for International Development (USAID/Haiti).

Using data from the 1986-87 HECS, estimated annual household medical expenditures averaged 136 gourdes in rural areas and 434 gourdes in urban areas. For rural households this represented only 1.67 percent of total household expenditures compared with 2.16 percent for urban households. While the budget share for health expenditures was small, most households did report expenditures. More than 80 percent of urban households indicated some expenditure, compared with nearly 70 percent of rural households. Health expenditures varied among several categories of services. Consultation fees, medicines, and "other costs" had the largest expenditure share regardless of geographic location or income level. Hospitalization and lab costs consistently ranked lower than other categories, due to their infrequent occurrence. Hospital costs were higher for those with high total expenditures (income), and for those in professional or government occupations and those living in urban areas.

Higher income groups and professional workers are more likely to have the financial resources and proximity to health suppliers to use such services. As expected, average health expenditures increased for higher income and larger households. Private clinics were the most frequent supplier of medical services in urban areas, while charlatans and free clinics were utilized most frequently in rural areas. The HECS data were also used to evaluate the extent of malnutrition and poor health as measured by weight and height. Anthropometric measures of weight and height for Haitian children age zero to five years were recorded in the survey, and show the poor nutritional status of Haitian children. As expected, Haitian children in this survey exhibited the short stature and wasting effects of malnutrition and disease. After weaning, young Haitian children fell increasingly behind standards for healthy children of comparable age. The results validate earlier studies. Additional multivariate analysis of these data showed household income, geographic location, and home environment were contributing determinants of children's weight and stature.

FOREWORD

In 1986, the Institut Haitien de Statistique et d'Informatique (IHSI) with support from the U.S. Agency for International Development (USAID) implemented a nationwide Household Expenditure and Consumption Survey (HECS) to gather socioeconomic data to analyze nutrition, health, welfare, food pricing policies, and other issues related to Title III, and to provide IHSI with data to calculate consumer price indexes and national accounts. Data were gathered from November 1986 through September 1987.

The 1986-87 HECS gathered data on food and nonfood expenditures including health services and medicines. It also recorded anthropometric statistics for children under five years of age and information on household demographics. This background paper details the health status indicators and health service consumption patterns reported through the survey data. This is one in a series of background, policy, and methods papers produced by the Center for Agricultural and Rural Development (CARD), Iowa State University, based on the HECS.

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HEALTH CONDITIONS AND EXPENDITURES IN HAITI: EVIDENCE FROM THE HAITI HOUSEHOLD EXPENDITURE AND CONSUMPTION SURVEY

Accurate information on health expenditure patterns is necessary for effective development and evaluation of health related policies. Despite many studies in Haiti to document the country's widespread malnutrition and poverty, limited data are available to describe household health service consumption patterns. Current survey data on health expenditures and choices, and analysis of anthropometric measures with regard to selected regional, environmental, and household factors provide important information for health policy planning and development in Haiti.

This report documents health consumption patterns and childhood health status from a recently completed nationwide survey. It is intended to establish baseline information on current medical expenditure patterns and the health situation in Haiti, as well as contribute to a better understanding of Haiti's health and nutrition situation. The nationwide Haiti Household Expenditure and Consumption Survey (HECS) was conducted from November 1986 through September 1987, following the departure of former President Jean Claude Duvalier in February 1986 and coinciding with a generally deteriorating economy. While changing political conditions affected the smooth operation of the survey, there is no evidence to suggest that the changes had a significant impact on the consumption patterns of the average Haitian, or on the quality of data collected.

This report investigates health expenditure patterns, including annual expenditures for health services and medicines, and two-week recall information on health source utilization. Patterns are established in reference to socioeconomic and regional factors. This report also examines anthropometric data as related to socioeconomic, regional, and environmental variables and compares current childhood weight and height with established health standards.

Health Factors in Haiti

Haiti is one of the poorest countries in the western hemisphere. It ranks among the World Bank's low-income economies (World Bank 1989). The 1982 Haitian Census recorded a population of more than 5 million people, and the World Bank estimated the population at 6.1 million in 1987, growing to 8 million by 2000 (1989). Port-au-Prince, the capital, has the largest urban population, with 750,000 residents. Nearly three-fourths of the population, however, live in rural areas without adequate income or access to government services.

Not only do those living in Haiti have low incomes, but population density is more than 218 people per square kilometer (World Bank 1989). Exposure to infections and the rate at which infection spreads is related to crowded living quarters. In urban centers, and Port-au-Prince in particular, the crowded conditions contribute directly to chronic health problems. The lack of adequate sewage disposal in such overcrowded conditions, combined with the warm climate, favors the contamination of water sources and the breeding of disease vectors such as fleas, flies, and mosquitoes.

Antiquated or nonexistent sanitation in the overcrowded cities and primitive water supply systems create an environment associated with poor health. City water supplies are not treated and only 13 percent of urban households have adequate sewage disposal (USAID 1985). Lack of potable water has been considered one of Haiti's most serious health problems (USDHEW 1973; USAID 1985). Despite the obvious connection between poor sanitation and significant health problems, the World Bank's 1985 Situation Note on population, health, and nutrition estimates that only 8 percent of homes in Port-au-Prince will have modern sewer connections by 2000.

Haiti, like most less developed nations, also falls short of providing needed health services. Estimates from 1972 showed Haiti had a much lower rate of physicians, nurses, and auxiliaries per 10,000 people than did other Latin American and Caribbean countries (USDHEW 1973). In 1975 the

U.S. Department of Health, Education, and Welfare reported 344 doctors employed in Haiti, 235 of whom resided in the capital, Port-au-Prince. In 1985, USAID estimated there were more than 600 physicians in the country. Other medical staff such as nurses, "agents de santé," and health care workers are poorly trained and poorly paid. Effective delivery of services is hampered by this lack of infrastructure and by low morale among the health care workers.

Poverty leads to malnutrition and in Haiti a large share of the population suffers from inadequate calorie and protein intake (Jensen et al. 1990). According to the 1986-87 HECS, an estimated 49 percent of households had less than 75 percent of the recommended level of food energy available, and 37 percent of households had less than 75 percent of the recommended protein level available (Jensen et al. 1990). Earlier studies found that infant feeding practices, as well as unsanitary conditions, produced the malnutrition in infants and children that can lead to physical stunting, mental retardation, and disease (USDHEW 1975; USAID 1985). Continued undernutrition for those children who survive to adulthood results in high rates of sickness and a short life span. Morbidity figures from the World Bank (1989) place Haitian life expectancy at 55, at least 10 years below average life spans for other Caribbean nations. According to estimates from the Haitian Ministry of Public Health and Population, the infant mortality rate is 120 per 1,000 live births, and rises to 150 per 1,000 live births inside Port-au-Prince (World Bank 1985).

To date, estimates suggest that one-half of all preschool children are ill at any given time and almost 30 percent of children under five exhibit symptoms of second- and third-degree malnutrition, which accounts for nearly all deaths among children in this age group (World Bank 1985). The general death rate is currently about 13 per 1,000, down from a rate of 16 in the early 1970s, but still well above the level common to the rest of Latin America (World Bank 1985).

In Haiti the most common causes of infant mortality and morbidity, according to the World Bank, are diarrhea and gastroenteritis, tetanus, measles, tuberculosis, malaria and intestinal parasites,

pneumonia, and typhoid. Malaria is the most often reported illness for adults, followed by pneumonia, bronchitis, diarrhea, and other diseases such as typhoid, syphilis, tuberculosis, and anemia (USAID 1985). Many of these diseases would not have a significant impact on a well-nourished population, but in Haiti, where resistance to disease and infection is weakened by malnutrition, they become life-threatening.

Many health and nutrition surveys have been conducted in Haiti. Several factors have warranted continued attention because of their relationship to health and nutrition, including water quality and sewage disposal, regional differences in access to care, features of household economic resources, and use of available health care services.

Water Quality and Sewage Disposal

Water sources and sewage control are frequently indicated as causes of ill health and health outcomes. The 1971 National Haiti Census concluded that 12.5 percent of the population had access to piped water of questionable safety. Thirty percent of Port-au-Prince had a direct water supply, but the quality of that water was not safe. In the rural areas, which accounted for 75 to 80 percent of the entire population, there was essentially no safe water supply and sewage disposal problems were as bad as in the urban centers. Subsequent studies have found essentially the same conditions (Beckles 1975; USDHEW 1973; Thacker 1980; Baer, Franklin, and Bertrand 1981; USAID 1985; Cayemittes and Chahnazarian 1989). Poor water quality (and quantity) has been associated with reduced health status and the increased incidence of health problems such as diarrhea and malnutrition (Thacker et al. 1977).

A health and nutrition survey of northern Haiti, conducted in 1981 by Baer et al., indicated that only 7 percent of northern Haitian households had access to safe drinking water while 61 percent had water of questionable quality, and 31 percent had clearly unsafe water sources. Only 10 percent of the surveyed households had latrines. Since there is an obvious connection between clean water and

good health, one of the more disturbing outcomes of this research was the discovery that well over one-half of childhood diarrhea cases were treated with some kind of tea or rehydration therapy. If the water used for these therapies was polluted or contaminated, the "cure" for diarrhea would increase the severity of the disease.

Regional and Location Factors

The 1978 Haiti Nutrition Status Survey (Bureau of Nutrition 1979) found that children's malnutrition levels differed among regions and between rural and urban centers, especially Port-au-Prince. For example, in this 1978 survey the prevalence of chronic malnutrition in children (less than 75 percent of standard weight using the Gomez scale), ranged from 15.7 percent in Port-au-Prince to 33.4 percent in the north. Population differences among regions ranged from 26.6 to 33.4 percent malnourished but were not statistically significant. Port-au-Prince had significantly higher rates of anemia compared to other regions, at about 50 percent for women and children as compared with levels of 20 to 30 percent in rural areas. These discrepancies may reflect differences in dietary patterns.

Access to health services also affects general health status and access differs among regions and between urban and rural locations. The 1978 National Census documented that rural inhabitants have less access to health services than do their urban counterparts (Bureau of Nutrition 1979). In part, this is due to greater travel distances for rural inhabitants (Baer, Franklin, and Bertrand 1981) because health services are concentrated in urban areas. Slightly more than 600 physicians were employed in 1985 by the Department of Health and Population in Haiti, with more than one-half of them located in Port-au-Prince (USAID 1985). This implies that rural residents are less likely to receive treatment for illness because medical facilities are not widely available in rural areas.

Household Demographics

Household demographic characteristics have also been shown to affect health outcomes. Several studies have found evidence that smaller household size, stable employment and income, and male-headed households were more likely to have improved health status as measured by children's weight and height (Brown, Heidgerken, and Jacobsen 1976; Thacker 1980; Coreil 1983).

Brown's 1976 study, conducted in the mountains of northern Haiti, concluded that as household size increased the incidence of malnutrition in children also increased. In households with more than six children, the incidence of malnutrition began to fall, perhaps because of the larger family labor force available to procure and produce food. Coreil's 1986 study on family resource allocation for health services in rural Haiti observed a similar relationship between household size and children's health (Coreil 1987).

Economic Resources

Better economic status and stable income have been shown to improve measures of health, although the direction and source of causality is not always clearcut. Some studies have found family income to have no statistically significant impact on children's anthropometric measurements (Kennedy 1983). Others, such as Graham (1972), Smith (1978), and Mason (1985) identify the positive effects of income, although the association with improved health is through increased food availability and is stronger for the upper half of the income scale.

Income stability does appear to be an important determinant of health. Brown, Heidgerken, and Jacobsen's 1976 study of malnutrition in northern Haiti observed that children living in homes with an employed household head were better nourished and generally in better health than those from unemployed households. Only 7 percent of children from families with regular incomes displayed symptoms of second- and third-degree malnutrition. But children in unemployed households had a 44

percent rate of malnutrition in these two categories. Thacker's 1980 report on water quantity and health problems also concluded that children's health was directly related to the employment status of the household head.

Other Factors Affecting Health Status

Breastfeeding and weaning practices have a direct impact on the health and nutritional status of infants and young children. King's 1978 compilation of Haitian nutritional data emphasized the synergistic effects of malnutrition and childhood disease that begin with inadequate infant feeding. While the majority of Haitian women breastfeed their children, they usually supplement with other foods and liquids after the first month. King's research noted that infant malnutrition appeared first between 6 and 18 months, corresponding with the beginning of supplemental feedings and the lag time for observable malnutrition to manifest itself. Various supplemental foods and liquids reported in several surveys include cow's milk, dry milk, starchy gruel, herb teas, boiled water, and bananas in sugar water (King 1978; Baer, Franklin, and Bertrand 1981). None of these substances contains substantial protein and those concocted with contaminated water produce diarrhea and malnutrition.

There is a common expectation that education levels correlate with job skills and income-generating abilities, as well as with an understanding of good nutrition and better health practices. Thacker's 1980 research into water-related morbidity and mortality found a negative correlation between educational status and disease occurrence. However, education variables had a positive effect on height for age, according to Smith's 1978 research. Since height measurements are generally considered to represent long-term nutritional conditions, the correlation to height measurements can probably be explained by the educated individual's long-term capacity to circumvent disease and malnutrition through knowledge of preventive therapies, and the economic means to pursue such measures.

One attempt to exploit the connection between education and good health has been the establishment of Mothercraft Centers in Haiti. These centers provide nutrition education to mothers enrolled in the dietary day care program for their children. There is conflicting evidence as to the success of these centers, due in part to self-selection that exists among participants. The siblings of participant children have demonstrated improved weight gains (*Nutritional Reviews* 1978), but these are difficult to associate with education.

Health Treatments and Access to Health Care

There is some evidence to suggest that many individuals treat themselves at home for health ailments, especially those living in rural areas. Different treatment practices may lead to different health outcomes. The preliminary results of Baer, Franklin, and Bertrand's study of health care utilization in northern Haiti (1981) found that for those reporting an episode of ill health in the two weeks prior to the survey, more than 65 percent treated their symptoms at home. Another 40 percent went to a dispensary for help, 21 percent sought hospital treatment, and about 2 percent consulted traditional healers.

A 1982 study by the Haiti Division of Family Hygiene, which looked at children and guardians using the services of government rally posts and health centers, found that despite the close proximity to health centers, more than 27 percent of those with health problems in the previous two weeks still treated themselves at home (Division d'Hygiene Familiale 1982). More than 50 percent used the health centers, another 11 percent consulted doctors at hospitals, 8 percent sought indigenous leaf doctors, and about 3 percent used pharmacy treatments. This information suggests that improved access to health care does increase health service usage, although home treatment of health problems is widespread even when health care is readily available.

The Haiti Household Expenditure and Consumption Survey

The 1986-87 HECS can be used to provide current background information on the status of health and health care usage, as well as to examine factors associated with observed indicators of nutrition and health status. The survey, conducted from November 1986 through September 1987, was carried out by the Institut Haitien de Statistique et d'Informatique (IHSI) with the support of USAID. IHSI implemented the survey with assistance from the Bureau of the Census (BOC) and the Center for Agricultural and Rural Development (CARD), Iowa State University. The procedures for this survey are described briefly below and in detail elsewhere (Bureau of the Census 1988).

Survey Design

The unit of observation for the HECS was the household, and the sample was drawn with a two-stage probability sample design from the population of all households in Haiti. The first stage was stratified by geographic areas (four planning areas divided by urban and rural and Port-au-Prince), and by socioeconomic characteristics (for urban areas by income and for rural areas by ecological zone, corresponding with socioeconomic characteristics). Initially, 312 target enumeration areas (SDEs) were designated, with data to be collected in 13 sequential four-week periods throughout the year. In the second stage of sampling, 10 households were drawn randomly within each SDE.

In total, interviews were conducted in 260 SDEs. This report includes data on 216 enumeration areas, providing data for the first nine periods of the survey. Data for periods 10 and 11 were collected, but were not available for processing at the time of this report. Including substitutions, the overall household response rate for the 11 periods was nearly 94 percent. From nine periods of data, 2079 households were available for analysis.

The survey was conducted throughout the 11 "month" periods. Each household was interviewed four times during a one-week period and asked questions on food expenditures, nonfood expenditures,

and other selected information. Visits were made to each survey household on Tuesday, Thursday, Saturday, and Sunday. During the first visit households were asked to report on recalled medical and health expenses for the previous year, along with other information. During the fourth visit households were asked to recall any health problems during the previous two weeks, and to outline treatment for each reported health problem. Also, weight and height measurements were taken for the oldest child in the household under five years of age (for children less than two, only weight measures were collected). The same interviewer collected all information on the household.

Survey Data Collection

The HECS questionnaire covered:

- housing characteristics and expenditures,
- general and economic characteristics of household members,
- inventory of food-on-hand (beginning and end of week),
- food expenditures and value of unprocessed food,
- expenditures for food consumed outside the household,
- expenditures for nonfood items including health services and medicines,
- agricultural production and expenses,
- anthropometric measures of children 0 to 5 years of age, and
- two-week recall health expenditures and health service choices.

This report focuses on health service expenditure patterns and health status indexes. Medical expenditures were subdivided into five categories: consultation fees, laboratory work, hospitalization, medicines, and "other." Both medical expenditures and anthropometric data were compared by characteristics of the household. The classification variables are defined below and described in Table 1. The distribution of households in Table 1 is reported in unweighted numbers and in percentage terms based on weighted data, reflecting the national population distribution.

Several classifications by region and location were identified, based on the survey stratification categories. The regional groups are based on the four planning areas and Port-au-Prince, the capital city. They are: North, Transversale, West (not including Port-au-Prince), South, and Port-au-Prince.

Table 1. Household characteristics in the Haiti Household Expenditure and Consumption Survey, 1986-87

Household Characteristics	Number (Unweighted)	Percent (Weighted)
Area		
Other Urban	1016	13.4
Port-au-Prince	335	14.7
Rural	728	71.9
Rural/Urban Location		
Urban	1351	28.1
Rural	728	71.9
Region		
North	442	13.7
Transversale	433	30.3
West (w/o PAP)	435	24.7
South	434	16.5
Port-au-Prince	335	14.7
Total Annual Household Expenditures (gourdes)		
0-2,000	148	9.1
2,000 - 4,000	337	21.0
4,000 - 6,000	272	15.3
6,000 - 8,000	218	12.0
8,000 - 10,000	165	8.4
10,000 - 12,000	157	6.0
12,000 - 14,000	111	6.0
14,000 - 16,000	107	4.3
16,000 - 18,000	77	2.3
18,000 - 20,000	68	2.3
20,000 +	419	13.3
Household Size		
1	163	8.0
2	231	10.1
3	278	14.0
4	330	17.2
5	276	14.1
6	265	14.0
7	186	8.2
8 or more	350	14.4
Occupation of Head		
Professional/Scientific/Government	122	3.7
Sales/Office/Household	434	15.4
Agricultural Worker	698	48.4
Industry/Transport	254	10.2
Unemployed/Unspecific	571	22.4
Employment of Head		
Employer	13	0.5
Salaried Employee	330	11.9
Independent Worker	1149	64.4
Family Worker	21	1.1
Unemployed/Unspecific	566	22.1

Note: Unless otherwise specified, all data are from the weighted sample, HECS 1986-87.

Area locations included two types of designations: first "urban" and "rural" and second "other urban," "Port-au-Prince," and "rural." The two different types of area classifications were used because for some comparisons the Port-au-Prince patterns were different from those for the other, smaller urban areas. More than 70 percent of households were from rural areas (Table 1).

Characteristics of the household head were used to classify the households. These included both the reported occupation and the employment status of the household head. These classifications provide information on the long-run socioeconomic potential of the household, and can be used as indicators of the long-run resources available for household consumption. As shown in Table 1, nearly one-half of household heads indicated they were agricultural workers. Only 10.2 percent reported industry or transportation occupations.

The household size was calculated as the sum of individuals reported to live with the household head. The average household size in rural areas is 4.77 members, slightly smaller than the level of 5.11 reported for urban areas (Table 2).

Total expenditures for each household were calculated on an annual basis by summing all reported household consumption expenditures, appropriately weighted to reflect annual value. The total expenditures were used as a measure of total income. Average total household expenditures for all of Haiti were estimated to be 11,486 gourdes (gds) or $2,297 (5 gds = $1) per year. The estimated per capita total expenditures was 2,360 gourdes or $472 per year for the survey period (Table 2).

Medical Expenditures

The medical expenditures reported by Haitian households offer insight into the availability of and access to medical care. Tables 2, 3, and 4 show the variation in expenditure patterns by type of expenditure and also by participation rates. Average household medical expenditures and household participation rates (i.e., percentage of households with expenditures) were calculated for selected sociodemographic and economic groups to identify factors associated with differences in health expenditure patterns. The calculations were

Table 2. Household characteristics from the 1986-87 Haiti HECS

Item	Mean	Standard Deviation
Household Size (number)	4.87	2.56
Rural	4.77	2.46
Urban	5.11	2.80
Total Annual Household Expenditures (gourdes)	11,486.30	19,750.60
Rural	8,118.20	19,029.47
Urban	20,094.18	18,933.28
Per Capita Total Expenditures (gourdes)	2,360.11	3,740.46
Rural	1,700.64	3,460.32
Urban	3,936.10	3,910.08
Total Medical Expenditures (gourdes)	219.65	1,001.24
Rural	135.75	800.77
Urban	434.10	1,364.48
Per Capita Medical Expenditures (gourdes)	45.13	169.35
Rural	28.44	121.54
Urban	85.03	244.26
Medical Budget Share (percent)	1.55	3.03
Rural	1.42	2.90
Urban	1.89	3.32

Table 3. Annual medical expenses in Haiti, 1986-87 (in gourdes)

Expenditure Group	Total Medical Expenses Mean	Std.*	Consultation Mean	Std.	Laboratory Mean	Std.	Hospitalization Mean	Std.	Medicines Mean	Std.	Other Medical Expenses Mean	Std.
Total Haiti	219.65	1001.24	30.95	105.52	16.49	100.76	22.99	417.22	81.45	286.47	67.78	609.55
Area (Urban/Rural)												
Urban	434.10	1364.48	62.77	178.46	41.42	170.01	68.98	781.74	164.51	479.06	96.42	374.03
Port-au-Prince	535.56	1608.27	79.32	219.07	56.61	214.79	108.36	1067.14	181.03	345.12	110.25	275.05
Other Urban	322.44	1020.04	44.56	115.98	24.70	126.51	25.64	163.88	146.33	591.90	81.21	458.44
Rural	135.75	800.77	18.50	49.78	6.73	35.33	5.00	43.77	48.95	143.62	56.57	679.52
Region												
North	157.88	540.95	24.08	75.27	12.78	96.33	6.77	58.45	68.25	228.65	46.01	333.06
Transversale	121.42	562.41	18.03	51.44	4.85	48.50	10.27	96.82	57.08	331.92	31.19	215.81
West (w/o PAP)	245.55	1348.16	32.53	80.71	15.68	57.86	4.50	30.67	72.26	251.67	120.57	1151.31
South	130.51	312.93	14.85	50.93	6.34	38.54	11.33	94.42	62.01	199.41	35.98	96.84
Port-au-Prince	535.56	1608.27	79.32	219.07	56.61	214.79	108.36	1067.14	181.03	345.12	110.25	275.05
Total Annual Household Expenditures (gourdes)												
0-2,000	13.81	35.51	3.78	10.17	0.41	3.68	0.00	0.00	5.90	20.42	3.71	18.62
2,001 - 4,000	36.49	70.48	6.58	16.56	1.51	12.06	1.63	11.40	12.48	31.62	14.29	41.47
4,001 - 6,000	70.81	173.50	14.05	28.31	3.98	19.98	3.06	34.12	32.81	102.61	16.90	75.12
6,001 - 8,000	87.88	139.56	17.40	30.38	4.02	14.11	0.53	6.14	45.78	104.15	20.14	45.12
8,001 - 10,000	226.64	313.41	58.78	101.04	26.01	52.94	2.36	29.62	109.78	167.49	29.70	87.13
10,001 - 12,000	271.45	423.97	24.25	36.40	8.61	39.20	18.11	50.99	131.90	255.35	88.58	278.35
12,001 - 14,000	142.48	268.07	22.85	70.83	11.13	59.00	17.33	84.05	61.08	156.91	30.09	61.79
14,001 - 16,000	235.52	395.03	25.88	42.12	9.30	28.26	23.68	133.76	119.54	292.92	57.12	134.38
16,001 - 18,000	339.23	598.44	50.52	100.20	21.48	58.35	61.46	383.60	130.44	290.08	75.32	186.70
18,001 - 20,000	293.01	396.76	23.84	39.46	19.67	47.75	45.77	210.24	106.98	148.19	96.74	209.01
20,000 +	910.31	2563.69	108.55	247.35	77.86	256.15	122.81	1119.83	278.98	659.39	327.10	1627.05
Household Size												
1	120.07	440.09	12.98	41.89	4.11	30.58	10.02	105.66	39.13	205.86	53.83	259.59
2	114.66	332.95	16.11	34.77	4.37	18.43	13.28	183.03	53.53	179.40	27.38	135.43
3	113.31	356.68	19.35	59.35	6.55	28.86	6.30	59.91	59.20	162.94	21.90	63.58
4	151.44	539.57	19.21	50.19	11.04	60.72	17.64	213.24	64.59	202.44	38.97	279.30
5	130.39	376.07	21.71	58.76	15.75	104.63	5.81	54.27	56.61	185.25	30.51	101.10
6	265.44	631.07	70.76	221.38	23.73	86.57	6.77	56.63	114.07	345.91	50.11	189.04
7	267.68	969.47	29.78	91.06	12.58	66.31	54.71	420.66	114.42	583.07	56.19	163.08
8 or more	549.29	2271.37	47.56	103.43	43.91	207.11	74.35	1005.72	140.13	313.31	243.34	1528.91
Occupation												
Prof/Scientific/ Gov't	996.71	3405.23	61.23	132.86	48.52	171.85	37.03	302.66	162.70	322.66	687.23	2496.03
Sales/Office/ Household	202.66	700.12	29.93	94.81	19.24	94.01	14.74	117.54	93.15	457.29	45.60	137.97
Agricultural Worker	91.90	225.83	11.46	25.95	2.82	21.44	6.42	58.64	37.93	116.11	33.27	137.11
Industry/Transport	423.74	1847.33	72.53	248.18	32.53	215.99	114.14	1241.30	131.96	438.47	72.58	209.45
Unemployed/ Unspecified	286.75	643.28	49.92	95.60	31.58	106.44	20.83	205.32	131.11	283.69	53.32	299.12
Employment												
Employer	183.40	322.14	21.42	34.14	13.70	56.40	46.50	199.24	28.90	53.02	72.88	151.33
Salaried Employee	595.89	2533.62	61.02	189.84	42.83	221.66	107.65	1159.10	126.21	332.52	258.17	1674.04
Independent Worker	130.99	438.36	19.07	83.75	6.37	48.96	8.20	75.34	58.75	280.46	38.60	142.88
Family Worker	97.91	155.10	24.72	39.51	14.02	35.34	1.87	8.02	46.81	64.95	10.49	58.43
Unemployed/ Unspecified	282.72	644.07	49.94	95.94	31.99	107.13	21.13	206.78	126.47	278.76	53.19	301.16
Schooling												
None	101.54	313.47	18.08	81.68	4.46	25.07	4.36	53.44	44.30	133.55	30.33	187.88
Primary	219.57	430.10	38.32	87.79	20.68	75.38	15.13	100.97	92.22	209.25	53.21	194.42
Secondary	620.79	2094.56	71.37	203.51	57.95	260.81	154.78	1298.05	228.59	714.37	108.10	402.10
University	3119.39	6136.03	132.26	219.04	144.98	282.5	22.68	138.23	379.19	571.46	2440.28	5393.90

* Standard deviation.

Table 4. Percentage of households in Haiti with annual medical expenses

Expenditure Group	Total Medical Expenses[a]	Percent of those Reporting Medical Expenses				
		Consultation[a]	Laboratory[a]	Hospitalization[a]	Medicines[a]	Other Medical Expenses[a]
Total Haiti	77.16	57.45	21.44	5.87	51.87	52.21
Area (Urban/Rural)						
Urban	81.20	62.10	27.91	7.11	59.22	56.70
Port-au-Prince	82.69	63.88	34.63	5.97	64.18	56.42
Other Urban	80.71	61.52	25.69	7.48	57.58	56.79
Rural	69.78	48.90	9.48	3.57	38.32	43.96
Region						
North	77.15	56.33	22.85	4.75	50.45	57.24
Transversale	75.06	57.51	15.94	6.00	43.65	43.65
West (w/o PAP)	73.15	55.17	18.16	5.06	49.89	46.21
South	79.26	55.99	18.66	7.60	54.15	58.53
Port-au-Prince	82.69	63.88	34.63	5.97	64.18	56.42
Total Annual Household Expenditures (gourdes)						
0-2,000	43.92	28.39	4.73	0.00	22.97	15.54
2,001 - 4,000	63.20	38.87	6.82	2.37	30.27	37.98
4,001 - 6,000	72.06	50.74	12.13	3.31	41.54	43.38
6,001 - 8,000	75.23	55.05	15.14	2.75	47.71	48.62
8,001 - 10,000	83.64	64.24	15.76	4.85	57.58	55.76
10,001 - 12,000	84.71	63.06	22.29	12.74	63.06	61.78
12,001 - 14,000	85.59	67.57	22.52	7.21	55.86	60.36
14,001 - 16,000	82.24	64.49	21.50	5.61	59.81	57.01
16,001 - 18,000	87.01	70.13	35.06	6.49	64.94	58.44
18,001 - 20,000	89.71	69.12	25.00	8.82	69.12	63.24
20,000 +	91.89	74.94	47.02	10.98	73.75	73.03
Household Size						
1	55.21	37.42	9.82	3.68	38.04	21.47
2	62.77	49.35	15.15	2.16	44.59	29.87
3	74.46	55.04	15.83	4.32	47.12	40.65
4	72.73	53.94	19.09	4.55	46.16	48.79
5	77.54	56.52	20.65	6.52	49.28	55.80
6	83.40	59.62	19.62	4.15	53.96	53.77
7	86.56	63.44	24.19	10.75	59.14	65.59
8 or more	93.43	73.43	38.29	10.00	69.14	75.14
Occupation						
Prof/Scientific/ Gov't	80.33	63.11	34.43	7.38	63.93	59.02
Sales/Office/ Household	79.03	56.45	22.81	6.45	53.92	54.38
Agricultural Worker	71.63	49.28	10.74	4.01	41.69	48.14
Industry/Transport	82.68	64.96	29.53	6.30	58.27	57.09
Unemployed/ Unspecified	79.51	63.75	27.15	7.18	57.44	52.10
Employment						
Employer	76.92	38.46	15.38	7.69	30.77	69.23
Salaried Employee	79.09	61.21	33.03	7.88	58.48	56.36
Independent Worker	75.46	53.52	15.14	4.53	47.43	51.26
Family Worker	76.19	57.14	33.33	9.52	47.62	38.10
Unemployed/ Unspecified	79.68	63.78	27.21	7.24	57.77	51.94
Schooling						
None	71.29	50.89	13.04	4.73	42.69	45.95
Primary	82.96	62.72	25.17	6.92	58.59	56.86
Secondary	83.23	66.15	36.96	6.83	64.91	60.87
University	73.68	63.16	52.63	10.53	63.16	68.42

[a] The percentage of all survey responses with a medical expense recorded.
[b] Of those recording a medical expense, the percentage who reported expenses in any/all of these categories.

made with data weighted to reflect the national population. The data were calculated from all the survey households.

Expenditures by Socioeconomic Groups

Overall, medical expenditures represented a small share of the household budget although a relatively high percentage of households reported expenditures (Tables 2 and 4). The small budget share, however, masks the fact that for some households medical expenditures may have been high. As expected, total medical expenditures and medical expenditures as a share of total expenditures were higher in urban areas. Per capita medical expenditures in urban areas were 85.03 gourdes compared with per capita medical expenditures of 28.44 gourdes in rural areas.

There were significant differences among households when classified by demographic and economic characteristics (Table 3). Higher medical expenditures were associated with higher incomes— household heads in professional, scientific, or government occupations (those with salaried income) and urban households, especially those in Port-au-Prince. These differences reflect both proximity to health care as well as income effects. They also highlight the fact that medical expenditures are not always associated with poor health and do not provide good measures of health problems or health status.

Table 3 also shows the mean expenditures by type of medical expense: consultation, laboratory, hospitalization, medicines, and "other." When averaged over all households, medicines, consultation, and other appear to represent the largest expenditures, although the standard deviations are large.

Variations among medical expenditures can be seen through analysis of participation rates. As shown in Table 4, more than three-fourths of all households report some type of medical expenditure, with more urban households (81.2 percent) reporting medical expenses compared to rural households (69.78 percent). Households more likely to report some medical expenditure during the survey

period included households with larger families, those living in Port-au-Prince and other urban areas, and those with household heads with higher incomes and more formal schooling.

Among those reporting some medical expenditure, the participation rates by type of expenditure vary as well. Of those reporting expenses, consultations, medicine, and "other" medical expenditures were more frequent than laboratory and hospitalization charges. These same categories were more frequently reported by those living in Port-au-Prince and other urban centers, and those with higher incomes, more schooling, and larger households. For example, 62 percent of urban households reporting medical expenditures had paid for consultation. Nearly three-fourths of households with incomes of more than 20,000 gourdes reported expenditures on consultations.

Characteristics associated with location, such as distance to available health care as well as characteristics such as income levels and household size, were associated with different expenditure patterns. For instance, Port-au-Prince residents, both high-income and poverty households, had easier access to the major share of medical services in Haiti. These conditions resulted in average medical expenditures significantly higher than those exhibited in the poorer, rural areas.

Participation rates for all types of health expenditures rose with income and household size (Table 4). Expenditures on specific types of health care rose with income and household size as well (Table 3). The presence of additional household members was likely to increase the need for medical services.

Differences in medical care usage were less apparent for households classified by occupational and employment status, although expenditure levels did vary. Among these groups, industrial and transportation workers and salaried employees showed unusually high average hospital expenses. This result is probably associated with higher representation in Port-au-Prince, although it may also reflect a high incidence of industrial or transportation accidents requiring hospitalization.

Analysis of Medical Expenditures

In order to identify the independent factors associated with medical expenditure patterns, a series of multivariate analyses were conducted using single-equation regression techniques. Medical expenditures were regressed on a set of socioeconomic characteristics for households reporting positive medical expenditures (Table 5). The analysis shows that higher income was a statistically significant determinant of medical expenses for all of Haiti and for urban and rural areas independently. Household size had a positive effect on medical expenditures and rural location had a negative effect. Residence in the north indicated a significant and positive impact on medical expenditures. Lack of education had a negative but statistically insignificant effect on medical expenses, while schooling of high school level or better had a positive and statistically significant impact on household medical expenditures. Again, the analysis was conducted for those with positive medical expenditures and thus did not condition those expenditures on factors associated with the household's initial decision to seek medical services.

In sum, the reported expenditure data from the 1986-87 HECS showed most households reporting some type of medical expenditure during the year, although the average level expenditure was quite low. Income, urban location, and larger household size were associated with higher expenditures.

Reported Health Problems and Disease Treatment

In section 10 of the Haiti Expenditure and Consumption Survey respondents were asked about episodes of illness in the previous two weeks and almost one-half the survey households (1,019) reported an illness for that period (Table 6). Additional information was gathered concerning any medical expenses for the illness and whether the individual consulted a private clinic, a pharmacist, a charlatan, a free clinic, a public institution, parents and friends, or no one at all. Note that the term *charlatan* refers to a traditional practioner using leaves and other herbs. These responses are compiled in Tables 6, 7, and 8, and are tabulated by regional, economic, and demographic variables.

Table 5. Regression results on medical expenditures

Variable	Estimated Coefficients[a]		
	Total Haiti	Urban	Rural
Dependent Variable Medical Expenses (ln)			
Independent Variables			
Intercept	-3.33 (-7.94)[b]	-3.23 (-6.60)	-3.62 (-4.83)
Total Expenditures (ln)	0.86 (18.71)	0.84 (15.62)	0.87 (10.00)
Household Size	0.02 (1.95)	0.04 (2.50)	-0.01 (-0.29)
Rural (0,1)	-0.30 (-3.74)		
North Region (0,1)	0.30 (3.68)	0.25 (2.53)	0.38 (2.67)
No Education (0,1)	-0.10 (-1.30)	-0.08 -0.87	-0.12 (-0.93)
High School/University (0,1)	0.24 -2.47	0.21 (2.11)	0.84 (2.23)
Adjusted R^2	.34	.29	.21
Number of Observations	1604	1096	507

[a]Estimated for all households reporting medical expenditures.

[b]t-statistic reported in parentheses.

Table 6. Reported health problems (two-week reporting period) and treatment

Household Characteristics	Total Number	Source of Care for Those Seeking Care: Private Clinic Number	Private Clinic Percent	Pharmacist Number	Pharmacist Percent	Charlatan Number	Charlatan Percent	Free Clinic Number	Free Clinic Percent	Pub. Institution Number	Pub. Institution Percent	Parents/Friends Number	Parents/Friends Percent
Total Haiti	1019	285	28.0	9	0.9	114	11.2	99	9.7	223	21.9	186	18.3
Area (Urban/Rural)													
Urban	633	221	34.9	8	1.3	44	7.0	55	8.7	148	23.4	120	19.0
Port-au-Prince	167	66	39.5	2	1.2	10	6.0	9	5.4	16	9.6	34	20.4
Other Urban	466	155	33.3	6	1.3	34	7.3	46	9.9	132	28.3	86	18.5
Rural	386	64	16.6	1	0.3	70	18.1	44	11.4	75	19.4	66	17.1
Region													
North	229	66	28.8			24	10.5	17	7.4	71	31.0	36	15.7
Transversale	201	64	31.8	2	1.0	23	11.4	15	7.5	52	25.9	27	13.4
West (w/o PAP)	202	48	23.8	2	1.0	28	13.9	30	14.9	29	14.4	37	18.3
South	220	41	18.6	3	1.4	29	13.2	28	12.7	55	25.0	52	23.6
Port-au-Prince	167	66	39.5	2	1.2	10	6.0	9	5.4	16	9.6	34	20.4
Total Annual Household Expenditures (gourdes)													
0-2,000	58					6	10.3	4	6.9	14	24.1	13	22.4
2,001 - 4,000	138	15	10.9			26	18.8	17	12.3	22	15.9	23	16.7
4,001 - 6,000	119	27	11.0	1	0.8	12	10.1	13	10.9	26	21.9	21	17.7
6,001 - 8,000	102	21	20.6			14	13.7	15	14.7	26	25.5	15	14.7
8,001 - 10,000	78	19	24.4			5	6.4	11	14.1	23	29.5	11	14.1
10,001 - 12,000	81	19	23.5			10	12.4	8	9.9	11	13.6	16	19.8
12,001 - 14,000	64	17	26.6			6	9.4	3	4.7	25	39.1	8	12.5
14,001 - 16,000	64	20	31.3	1	1.6	13	20.3	3	4.7	12	18.8	15	23.4
16,001 - 18,000	28	11	39.3			5	17.9	2	7.1	6	21.4	7	25.0
18,001 - 20,000	41	6	14.6	1	2.4	2	4.9	9	22.0	10	24.4	11	26.8
20,000 +	246	130	52.9	6	2.4	15	6.1	14	5.7	48	19.5	46	18.7
Household Size													
1	29	7	24.1			3	10.3	3	10.3	6	20.7	7	24.1
2	71	18	25.4			10	14.1	6	8.5	7	9.9	19	26.8
3	102	25	24.5	2	2.0	11	10.8	5	4.9	28	27.5	14	13.7
4	165	38	23.0			16	9.7	22	13.3	35	21.2	29	17.6
5	156	39	25.0	2	1.3	21	13.5	14	9.0	45	28.9	26	16.7
6	136	38	27.9			18	13.2	15	11.0	31	22.8	19	14.0
7	113	29	25.7			5	4.4	13	11.5	26	23.0	18	15.9
8 or more	247	91	36.8	5	2.0	30	12.2	21	8.5	45	18.2	54	21.9
Occupation													
Prof/Scientific/ Gov't	72	25	34.7	2	2.8	1	1.4	6	8.3	21	29.2	13	18.1
Sales/Office/ Household	202	55	27.2	4	2.0	23	11.4	15	7.4	48	23.8	34	16.8
Agricultural Worker	333	64	19.2			65	19.5	49	14.7	66	19.8	54	16.2
Industry/Transport	114	47	41.2			8	7.0	4	3.5	28	24.6	21	18.4
Unemployed/ Unspecified	298	94	31.5	3	1.0	17	5.7	25	8.4	60	20.1	64	21.5
Employment													
Employer	6	3	50.0			1	16.7						
Salaried Employee	147	48	32.7	4	2.7	8	5.4	10	6.8	40	27.2	28	19.1
Independent Worker	557	138	24.8	2	0.4	83	14.9	62	11.1	122	21.9	92	16.5
Family Worker	12	2	16.7			5	41.7	2	16.7	1	8.3	1	8.3
Unemployed/ Unspecified	297	94	31.7	3	1.0	17	5.7	25	8.4	61	20.2	65	21.9
Schooling													
None	451	81	18.7	1	0.2	76	16.9	46	10.1	90	20.0	79	17.5
Primary	397	116	29.3	5	1.3	28	7.1	44	11.2	102	25.7	79	19.9
Secondary	165	83	50.3	3	1.8	9	5.5	8	4.9	28	17.2	29	17.8
University	5	3	60.0	0	0	0	0	0	0	0	0	1	20.0

Table 7. Expenditures for reported health problems (two-week reporting period)

Household Characteristics	Average Expenditure for Those Reporting Expense (in gourdes)				
	Private Clinic	Pharmacist	Charlatan	Free Clinic	Public Institution
Haiti Total	15.29	18.05	26.23	6.08	5.15
Area (Urban/Rural)					
Urban	22.8	27.9	12.2	4.9	4.3
Port-au-Prince	24.13	3.0	9.7	3.9	3.8
Other Urban	21.1	12.0	15.1	6.1	4.5
Rural	10.7	5.0	28.9	6.5	5.4
Region					
North	19.1		38.7	3.3	7.1
Transversale	11.7	12.0	21.9	3.5	5.1
West (w/o PAP)	12.2	5.0	10.2	8.0	2.1
South	9.6		55.9	11.2	4.9
Port-au-Prince	24.1	33.0	9.7	3.9	3.8
Total Annual Household Expenditures (gourdes)					
0-2000			13.9	2.3	4.0
2001-4000	8.5		22.9	4.9	4.0
4001-6000	11.0	5.0	6.0	17.5	5.4
6001-8000	9.7		12.4	4.9	6.0
8001-10000	8.9		35.6	5.2	6.1
10001-12000	15.1		33.5	6.4	2.4
12001-14000	19.4		38.3	1.0	4.5
14001-16000	11.4		73.6	6.5	4.9
16001-18000	18.7		10.3	4.3	10.4
18001-20000	9.7		7.0	7.5	3.9
20000+	21.2	27.9	9.1	4.3	4.2
Household Size					
1	33.4		2.2	6.3	6.8
2	20.7		76.0	39.0	12.0
3	12.7		9.8	1.6	4.1
4	22.0		32.4	4.4	5.8
5	14.4	5.0	10.1	3.4	5.3
6	12.7		34.0	4.8	4.1
7	11.9		5.4	8.7	3.1
8 or more	14.1	27.9	31.2	4.2	5.2
Occupation					
Prof/Sci/Gov't	16.6		10.0	2.0	4.5
Sales/Office/Household	18.1	12.0	23.3	7.0	4.1
Agriculture Worker	9.8		29.9	6.2	4.8
Industry/Transportation	14.2		15.0	5.0	7.3
Unemployment/Unspec.	21.7	19.0	9.9	5.1	4.9
Employment					
Employer	44.8				
Salaried Employee	16.8		13.7	3.1	5.2
Independent Worker	11.8	12.0	29.9	6.2	5.2
Family Worker	4.7		7.4	8.0	1.0
Unemployed/Unspec.	21.7	19.0	9.9	5.1	4.9
Schooling					
None	9.9	5.0	28.3	7.1	4.5
Primary	18.8	33.0	22.6	5.2	6.0
Secondary	19.2	12.0	5.0	4.2	4.1
University	30.0	0	0	0	0

Table 8. Expenditures for medications to treat reported health problems (two-week reporting period)

Household Characteristics	Households Who Received Medications				
	Total Number	Percent of Household Group	Percent with Purchase	Average Expense (gourdes)	Percent Receiving Free
Haiti Total (=1,019)	735	72.1	60.0	39.4	12.2
Area (Urban/Rural)					
Urban	491	77.6	68.3	55.5	9.3
Port-au-Prince	116	69.5	59.3	56.9	10.2
Other Urban	375	8.50	71.5	54.0	9.0
Rural	244	63.2	46.4	31.9	16.8
Region					
North	169	73.8	60.3	45.0	13.5
Transversale	152	75.6	59.2	45.0	16.4
West (w/o pap)	136	67.3	56.9	33.1	10.4
South	162	73.6	63.6	18.7	10.0
Port-au-Prince	116	69.5	59.3	56.9	10.2
Total Annual Household Expenditures (gourdes)					
0-2000	32	55.1	44.8	6.1	10.3
2001-4000	68	49.3	34.1	14.8	15.2
4001-6000	95	79.8	57.1	22.1	22.7
6001-8000	79	77.4	58.8	24.3	18.6
8001-10000	59	75.6	56.4	39.6	19.2
10001-12000	54	66.7	59.3	43.8	7.8
12001-14000	52	81.2	70.3	47.6	10.9
14001-16000	50	78.1	70.3	45.1	7.8
16001-18000	23	82.1	75.0	58.8	7.1
18001-20000	30	73.2	63.4	26.8	9.8
20000+	193	78.5	73.6	75.0	4.9
Household Size					
1	21	72.4	51.7	35.4	20.7
2	46	64.8	53.5	51.2	11.3
3	75	73.6	60.8	33.7	12.8
4	112	67.9	58.8	32.6	9.1
5	118	75.6	62.8	36.3	12.8
6	98	72.1	57.4	27.6	14.7
7	81	71.6	56.6	33.6	15.0
8 or more	184	74.5	64.4	55.5	10.1
Occupation					
Prof/Sci/Gov't	59	82.0	76.4	47.0	5.6
Sales/Off/House	145	71.8	63.4	50.0	8.4
Agricultural Worker	230	69.1	49.3	29.0	19.8
Industry/Transportation	84	73.7	68.4	47.3	5.3
Unemployment/Unspec.	217	72.8	62.4	43.1	10.4
Employment					
Employer	3	50.0	50.0	300.2	
Salaried Employee	112	76.2	72.8	50.2	3.4
Independent Worker	394	70.7	55.3	34.8	15.4
Family Worker	8	66.7	50.0	21.1	16.7
Unemployed/Unspec.	218	73.4	63.0	43.1	10.4
Schooling					
None	304	67.4	49.9	27.8	17.5
Primary	294	74.0	63.6	44.9	10.4
Secondary	131	79.1	76.1	65.7	3.1
University	4	80.0	80.0	84.2	0

For a country as poor as Haiti, it was surprising to find private clinics as the most popular treatment centers (28 percent), followed by public institutions (21.9 percent), consultation with parents or friends (18.3 percent), and the services of a charlatan (11.2 percent). The remaining households sought treatment at a free clinic (9.7 percent), a pharmacy (0.9 percent), or received no call (treated themselves at home) (Table 6).

While private clinics were the overall first choice for treatment, those who used such services tended to live in Port-au-Prince and other urban areas, to have higher incomes and more schooling, and to be employed in professions, government, sales, or industry, or as transportation workers (Table 6). This pattern is consistent with the fact that most private medical services are available only in urban areas and cost more than free clinics and public institutions (Table 7).

Charlatans and free clinics were used most heavily in rural areas. Household members that chose one of these two services tended to be less educated and identified themselves as agricultural or family workers (Table 6). To a large degree this pattern may reflect the only medical care readily available to rural residents. Public institutions were also used in rural areas, but were not exclusive to any particular group regardless of economic, schooling, or location factors.

Consultation with parents and friends and self-treatment (or no consultation) is a common choice for Haitian households during times of illness. This particular response to illness is popular worldwide and may reflect financial constraints that prohibit the use of costly medical treatment. In some cases it may reflect a response to less severe illnesses that are not perceived as requiring professional medical attention.

The traditional healer, or charlatan, ranked as the most expensive medical practitioner (Table 7), averaging 26.23 gourdes across all 1,019 households. Since alternative medical facilities are not widely available in rural areas, charlatans were employed more extensively there. For low-income and rural households this may represent a serious impediment to satisfactory health care. However, charlatans are not consulted simply because they are the only service available. Many urbanites, even

well-educated and high-income Haitians, sought the services of a traditional healer because some illnesses are perceived as beyond the scope of western allopathic medicine and treatable only through traditional methods (Table 6).

Treatment for illness often involves medicines and Table 8 lists those who received medicines during their treatment consultation and the percentage of those receiving free medications. It is encouraging to note that the large portion of free medication recipients were those most in need—the uneducated, low-income, rural or agricultural households, and family workers.

Anthropometric Measures of Nutrition and Health

In addition to expenditure and health care data, anthropometric data provide key indexes of the nutritional and health status of children. In a country like Haiti, where poverty and undernutrition are common, the prevalence of low anthropometric values are anticipated and reflect malnutrition in the population. Comparing Haitian anthropometric data with appropriate reference populations allows a representation of the magnitude and distribution of malnutrition and, by extension, presents a picture of the general health status of Haitian children.

Probably the most frequently used anthropometric index of nutritional and health status is weight for age. However, a one-time measure of weight is not always useful because weight can fluctuate more rapidly than height. A single weight observation cannot differentiate between a tall, thin, undernourished child, and a short but well-proportioned child who exhibits the symptoms of previously stunted growth. Despite limits to the weight measure's informative capacity, in general it is true that low weight for age children are showing the effects of malnutrition. For comparison purposes, weight for age data are presented using the Gomez scale of malnutrition. In this classification, first-degree malnutrition in children is identified as 75 to 89.9 percent of the National Center for Health Statistics (NCHS) reference median for weight. Second-degree malnutrition is 60 to 74.9 percent of the reference median and third-degree malnutrition is any weight measure below 60

percent of the standard. Any children above 90 percent of the reference median are considered "normal" weight in the Gomez classification.

The height for age measurement is useful as an index of stunting or chronic malnutrition. Short-term nutritional deficiency does not normally result in growth retardation, but long-term nutritional deprivation, especially during the early years of development, will usually result in stunted growth. Children with a height for age less than 90 percent of the NCHS reference median are generally considered stunted as a result of nutritional deficiencies.

In order to relate body mass to stature, weight for height indexes can be calculated. A low value for this index reflects acute undernutrition, a condition called wasting. For survey purposes wasting is defined as a weight for height value less than 80 percent of the NCHS reference population. Children that fall in the 80 to 84.9 percent range are classified as moderately wasted. Weight for height standards have the advantage of being independent of age and provide a means to distinguish between previously stunted children and currently malnourished and wasted children.

Previous Haitian Anthropometric Studies

A number of nutrition studies show problems of malnutrition and health for children in Haiti. Jelliffe's 1958 (1961) medical and anthropometric study of 2,343 Haitian children ages zero to 12, concluded that only about 67 percent of the study population were at normal weight levels for age. All remaining children in this survey suffered from some degree of malnutrition. Jelliffe's anthropometric measures also suggested that during the first six months of life Haitian children fared better than in the ensuing six months. This presumably reflected the effects of initial maternal breastfeeding and the lag time for severe malnutrition to exhibit itself in physical symptoms.

Sebrell et al.'s 1959 appraisal of Haiti's health and nutrition also used anthropometric measures, but this time focused on adults and children five years and older. Even with the increased age of the survey population, 51 percent of the study group fell below the 90th percentile of U.S. standards.

The only real deviation from this pattern of retarded growth was seen in more economically favorable communities.

In 1963 King et al. conducted an anthropometric survey of 7,409 Haitian children zero to 18 years old. Distinctly lower weight and height measures were again found for Haitian children as compared to U.S. standards. However, growth curves for wealthier Haitian children closely approximated American standards and King suggested this as evidence that ethnic differences had little effect on optimal weights and heights.

In 1978 Haiti conducted a National Nutrition Status Survey (Bureau of Nutrition, Department of Public Health and Population). For this survey, measures of weight and height were recorded for 5,353 preschool children. The survey found that 6.4 percent of rural children were severely wasted compared to 3.8 percent in Port-au-Prince. The prevalence of stunting from chronic undernutrition ranged from 26.6 to 33.4 percent of the population in different rural areas and registered only 15.7 percent in the capital city, an important but significantly lower figure.

These studies document that the health and nutritional status of children and adults in Haiti, as in many developing countries, is severely threatened and they also reveal the discrepancies between rural and urban conditions. The lower median weights and heights of rural children can be ascribed to lower income levels, poor nutrition, and infectious diseases in rural households. While these same conditions exist in many urban households, health status differences between rural and urban inhabitants seem to be explained better by differences in economic status rather than location. As in several of the preceding studies, wealthy Haitian children exhibited anthropometric measures essentially the same as their U.S. counterparts. This suggests that environmental or socioeconomic factors are much more important determinants of the median weight and height of children than are genetic factors. Undoubtedly genetics is responsible for much of the variability among children, but

when children from the same population are compared on the basis of economic and environmental influences, median weights and heights differ markedly.

HECS Anthropometric Data

The HECS included anthropometric data on a subset of children. On the fourth visit to each household, the surveyor recorded anthropometric data in the tenth section, part C of the survey's health section. For households with children five years of age or less, the oldest child under five was weighed in pounds. The child's age was recorded and if the child was 24 months or older, a height measurement in centimeters was also recorded.

A total of 751 children were accounted for in this manner, with either age, weight, or height information, or some combination of these three. A preliminary analysis revealed that there were missing values for one or two categories for many of the children. In addition, there were several outlying weights and heights that seemed to represent unreasonably short or light weight children, considering their given age. In screening the data, cutoff boundaries were devised for each six-month age sequence in an attempt to exclude erroneous data.

A U.S. National Center for Health Statistics (NCHS) table of weight and height medians and standard deviations for a North American population was used as a template to create six-month boundaries for the Haitian anthropometric data. Within each six-month range, the lowest mean weight and height for female children and the highest mean for male children were used as initial starting points for each boundary. The boundaries were then extended four standard deviations in either direction to insure the most generous inclusion of data while deleting extreme, and supposedly incorrect, weight and height values. The net result was eliminating only 15 individuals who fell below the low end of the weight and height boundaries.

The edited data set contained 736 observations. This was further divided for specific anthropometric analysis in three subdivisions: those with both age and weight recorded (702 children),

those with both age and height measurements (511 children, almost all older than 24 months), and those who had positive age, weight, and height measures simultaneously (470 children).

Weight and Height Comparisons to NCHS Standards

In order to compare the Haiti anthropometric measures with NCHS standards, all weight and height observations were sorted by age in months and gender. Since the HECS children were not initially separated by gender, this process helped to reveal additional missing data. The final weight for age sample consisted of 652 children, the height for age sample contained 479 children, and the weight for height sample was reduced to 448 children. Tables 9, 10, and 11 show the results of these comparisons, highlighting the prevalence of malnutrition, stunting, and wasting in the HECS survey sample. Figures 1 and 2 compare the median weight and height data to NCHS standards.

Weight comparisons using the Gomez scale found 85 percent who fell into the normal and first degree malnutrition categories (Table 9). This percentage was higher than in other surveys using NCHS standards, such as the 1978 National Survey (72.8 percent) and the 1982 Arniquet Survey (77 percent) (Division d'Hygiene Familiale), but consistent with these other surveys was the observable trend towards higher malnutrition as the children's ages increased. This trend shows the effects of weaning children to an inadequate diet, and the increased incidence of illness and disease that often accompanies such poor nutrition.

When all 652 children were separated by location, rural children showed higher representation in the lowest levels of malnutrition (19.2 percent) compared with their urban counterparts (12.3 percent). The 1978 National Survey results observed a significantly higher (29.5 percent) rate of serious and severe malnutrition among rural children. When the sample was separated by gender there was no significant difference in the percentages for each malnutrition category.

The height for age sample consisted of children between the ages of 2 and 5 (Table 10). Height for age is an indicator of long-term nutritional deprivation and this sample indicated a percentage of

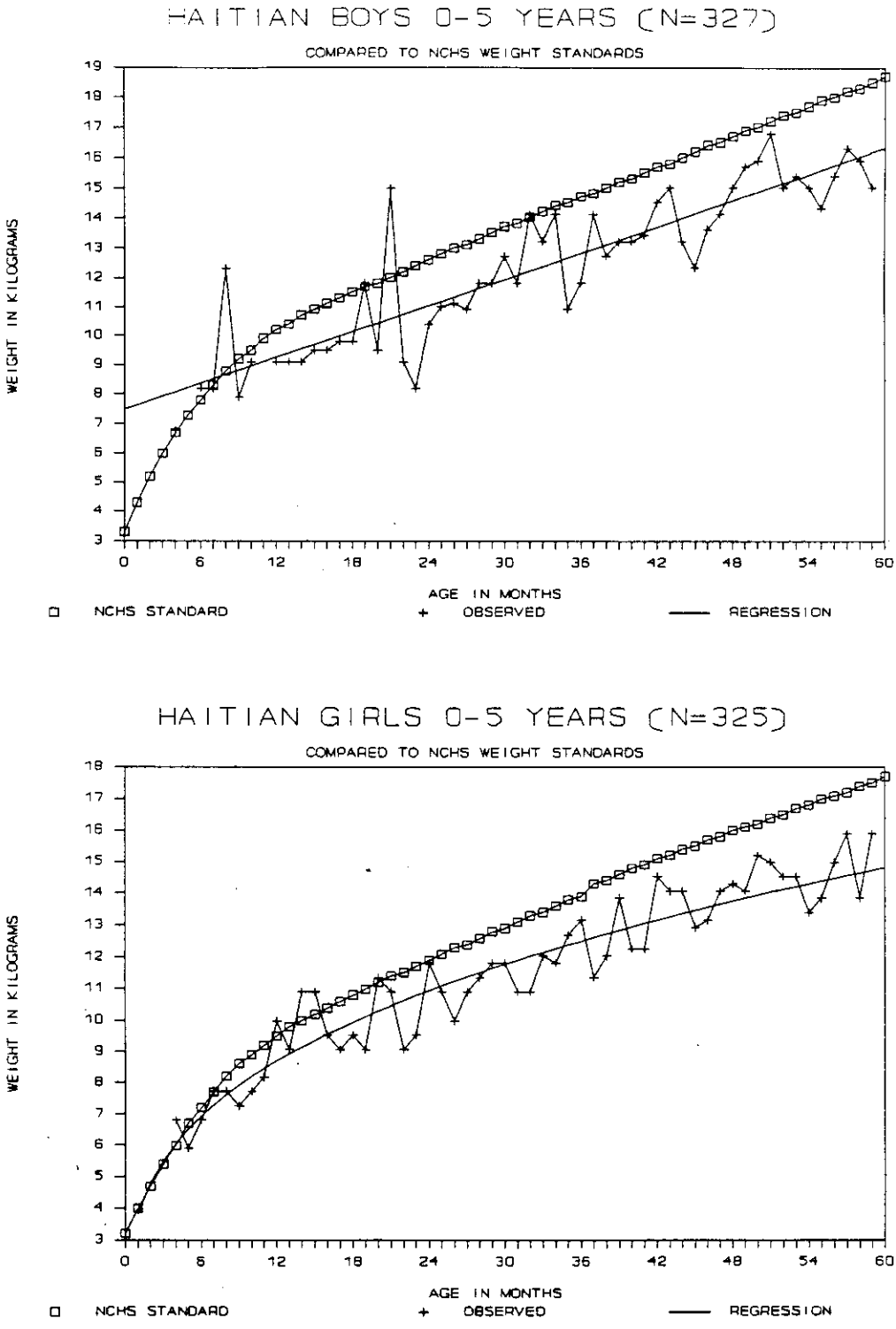

Figure 1. Median weight for age comparisons between Haitian children and NCHS standards

Table 9. Distribution of Haitian children 0 to 5 years by nutrition standard

	Degree of malnutrition as a percentage of NCHS median weight standards				
	Third < 60.0	Second 60.0-74.9	First 75.0-89.9	Normal 90.0+	Total Number
Total sample	0.8	14.3	40.3	44.6	652
0-5 months	0.0	20.0	20.0	60.0	10
6-11 months	0.0	11.8	35.3	52.9	34
12-23 months	0.9	12.4	45.1	41.6	113
24-35 months	0.7	13.3	36.7	49.3	150
36-47 months	0.0	18.4	39.1	42.5	179
48-59 months	1.8	12.0	44.0	42.2	166
Rural	1.6	17.6	45.0	36.0	256
Urban	0.2	12.1	37.4	50.3	396
Male	0.6	15.0	40.4	44.0	327
Female	1.0	13.5	40.3	45.2	325

Table 10. Distribution of Haitian children 2 to 5 years by height for age

	Prevalence of stunting as a percentage of NCHS median height standards				
	Stunting		Normal		
	< 85.0	85.0-89.0	90.0-94.9	95.0+	Total Number
Total sample	9.4	17.8	26.5	46.4	479
24-35 months	5.0	15.8	28.8	50.4	139
36-47 months	11.2	19.0	24.6	45.3	179
48-59 months	11.2	18.0	26.7	44.1	161
Rural	15.1	22.9	33.0	29.1	179
Urban	6.0	14.7	22.7	56.7	300
Male	7.8	15.9	25.7	50.6	245
Female	11.1	19.7	27.4	41.9	234

Table 11. Distribution of Haitian children 2 to 5 years by weight for height

	Prevalence of wasting as a percentage of NCHS median weight for height measures			
	Severe <80.0	Moderate 80.0-84.9	Normal 85.0+	Total Number
Total sample	3.6	5.1	91.3	448
24-35 months	3.0	6.8	90.2	133
36-47 months	3.6	3.6	92.8	166
48-59 months	4.0	5.4	90.6	149
Rural	2.5	6.7	90.8	163
Urban	4.2	4.2	91.6	285
Male	3.0	3.9	93.1	231
Female	4.1	6.5	89.4	217

stunted children (27.2 percent) comparable to the 1978 National Survey (26.6 percent). Comparisons by gender indicated that girls showed stunting at a higher rate than boys (30.8 to 23.7 percent). Rural children were also more likely to show the effects of stunting (38 percent) than urban children (20.7 percent), but this separation by location was significantly more pronounced than in the 1978 National Survey, where only 28.6 percent of the rural survey population was clinically stunted. As with weight for age, stunting appeared more often among older children, reflecting the lag time necessary for long-term nutritional deprivation to manifest itself in retarded stature.

The last comparison matched Haitian children's weight for height with comparable NCHS standards (Table 11). In the sample of 448 children, 8.7 percent fell into the wasted category, slightly more than one-half the percentage reported in the 1978 survey. As expected, rural children showed a greater incidence of wasting than urban children (9.2 to 8.4 percent), but still fell far below the findings of the 1978 National Survey (16.8 percent). Girls had 10.6 percent wasting compared to 6.9 percent for boys. Wasting by age group was fairly consistent and showed no obvious trend towards increased severity with age.

In general, results from the 1986-87 HECS indicate some improvement in Haitian children's nutritional status as compared to the 1978 National Survey. Weight for age and weight for height measures are significantly better, with more children in the normal and near normal ranges, although gender and locational discrepancies are still prominent. Height for age is the only measure with no improvement, especially for rural children who actually exhibit a greater prevalence of stunting than they did in 1978.

Factors Affecting Anthropometric Measures

Regression analysis of the anthropometric data was used to investigate the influence of demographic variables and environmental factors on measures of childhood health and nutrition. Weight and height were set as dependent variables. Each equation used nine independent variables:

age in months, age in months squared, per capita household income, number of household members, and several binary variables including household location, household water source, latrine facilities, and education (no formal schooling and high school or college level education). The results are reported in Table 12.

Because the variation in weight and height increases with age, each observation within a six-month interval was weighted during regression analysis by multiplying it by the inverse of the variation for that interval. In this manner, the data were normalized for statistical analysis without biasing the results. The overall results for the weight and height analysis were good, as measured by the adjusted R-square.

Age in Months. As anticipated, age in months had a positive and statistically significant impact on both anthropometric measures. A negative coefficient on the age-squared variable was evidence that growth rates decrease with age. Age variables greatly influence anthropometric measures and are probably the best predictors of weight and height changes for Haitian children.

Per Capita Income. Per capita income, measured as total expenditures, also had a statistically significant and positive effect on both anthropometric measures. This follows from the assumption that household income is directly related to the ability to purchase food and medical attention. The availability of food and medicines would in turn have a direct impact on childhood health and nutritional status and be reflected in weight and height measures. Income levels also indicate, to some degree, the educational background of household wage earners. Members of highly educated, high-income households are more likely to benefit from adult knowledge of proper nutrition and preventive medicine.

Household Size. Household size also positively affected the nutrition-related anthropometric measures, but the results were not statistically significant. Contrary to observed U.S. trends, Haitian

Table 12. Regression results on Haiti anthropometric measures

Independent Variable	Weight (in kg)	Height (in cm)
Intercept	5.017	64.072
	(14.133)[a]	(14.780)
Age		
Age in Months	0.266	0.736
	(14.633)	(3.360)
Age in Months Squared	-0.002	-0.002
	(-5.705)	(-0.868)
Sociodemographics		
Per capita income (total expenditures)	0.0002	0.0005
	(4.289)	(2.968)
Household size	0.032	0.130
	(1.044)	(1.087)
Living in Rural Areas	-0.267	-2.055
	(-1.491)	(-2.997)
Living in Port-au-Prince	-0.375	-0.635
	(-1.467)	(-0.627)
Living in North Region	0.186	-0.178
	(1.043)	(-0.249)
No education (household head)	0.072	0.509
	(0.442)	(0.811)
High School/University (household head)	-0.336	0.587
	(-1.431)	(0.626)
Environmental		
Clean Water Source	0.556	1.971
	(2.542)	(2.369)
Indoor Latrine	0.330	-2.398
	(0.641)	(-1.064)
Adjusted R^2	67.96	50.33
F Value	135.992	47.422
Number of Observations	700	504

[a] t-statistics values reported in parentheses.

household income and size move upwards together, so this may explain the positive parameter estimates.

Location. Living in rural areas had a statistically significant negative effect on the children's height and weight. Although not statistically significant, Port-au-Prince residence also showed a negative effect

on the anthropometric measures. Living in the north, holding other factors constant, had no statistically significant impact on measured outcomes.

Environmental Conditions. Of particular interest is the finding that environmental sanitary conditions were, as expected, significant factors contributing to the nutrition outcome. Households with in-home/in-yard running water as well as those using bottled water had better nutritional outcomes than others using potentially more contaminated river water, well water, and public fountains. Since water supply affects exposure to disease, diarrhea, and parasites, children in households with more healthful water sources weighed more and were taller.

Households with indoor latrines or "water closet" facilities were presumed to reflect homes with some form of sewage or plumbing services. Households not represented by this variable would include those with latrines in the yard, outside the yard, and those with no latrines. Neither the weight nor height regressions found the latrine variable to be significant, but the parameters for latrine facilities in the weight and height equations were found to be positive and negative, respectively.

Summary and Conclusions

The 1986-87 HECS confirmed evidence from earlier studies that health care and related nutritional outcomes in terms of children's weight and growth are persistent problems in Haiti. Anthropometric measures of weight and height for Haitian children ages zero to five years showed relatively poor nutritional outcomes, particularly for measures of stunting, which are indicators of

long-term nutritional inadequacies. Nearly 15 percent of the Haitian children showed second- and third-degree malnutrition by the Gomez malnutrition classification on weight. This percentage was a bit lower than in earlier surveys using the NCHS standards. As children's ages increased, the degree of malnutrition also increased. Rural children were more likely to show signs of malnutrition.

Height for age assessments, indicating long-term nutritional deprivation, showed nearly 27 percent of young children to be stunted, a figure comparable to rates observed in the 1978 National Survey of children. Again, rural children were more likely to show stunting. As with the weight indicators, stunting appeared more often in older children.

In general, the results from the 1986-87 HECS showed some improvement in Haitian children's nutritional status as indicated by anthropometric measures. However, the improvement was primarily in indicators that may improve in the short run. This provides some evidence that, during the 1986-87 period, food and nutritional conditions may have improved in Haiti, relative to earlier periods, and that had an effect on children's nutritional status. Despite overall improvement, rural areas continued to show poor conditions.

The information on health care and medical care expenditures shows widespread use of both formal and informal medical services. More than 80 percent of urban households and 70 percent of rural households reported some health-related expenditures. Income was a statistically significant predictor of the level of medical expenditures. Private clinics and public institutions were important providers of medical services. Charlatans and free clinics were relatively more important as providers in rural areas compared with urban, and comparable importance compared with other private and public centers. This evidence suggests the importance of an integrated approach to delivering medical services that rely on the services of a variety of institutions, both traditional and more modern, especially in rural areas.

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